

## CLAIMS

What is claim is:

1. A golf ball comprising:  
an inner core having a compression of less than about 65;  
5 at least one outer core layer surrounding the inner core and having a hardness of at least 80 Shore C and a specific gravity greater than or equal to a specific gravity of the inner core; and  
a cover surrounding the outer core layer;  
wherein the inner core has a hardness less than a hardness of the outer core.  
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2. The golf ball of claim 1, wherein the inner core hardness is about 78 Shore C and the outer core hardness is greater than about 90 Shore C.
3. The golf ball of claim 1, wherein the inner core compression is less than about 50 and  
15 the inner and outer cores have a combined dual core compression of from about 80 up to about 100.
4. The golf ball of claim 1, wherein the inner core specific gravity is about 1.13.
- 20 5. The golf ball of claim 1, wherein the inner core has a diameter of from about 1.4 inches to about 1.5 inches and the outer core has a thickness of from about 0.05 inches up to about 0.1 inches.
6. The golf ball of claim 1, wherein the inner core has a coefficient of restitution of from  
25 about 0.8 to about 0.825 and the inner and outer cores have a combined dual core coefficient of restitution of from about 0.805 up to about 0.83.
7. The golf ball of claim 1, wherein the inner core comprises about 100 pph of a  
polybutadiene rubber, greater than about 25 pph of a zinc diacrylate, greater than about  
30 0.5 pph of an organic peroxide and a sufficient amount of filler to produce the inner core specific gravity.

8. The golf ball of claim 1, wherein the outer core comprises about 100 pph of a polybutadiene rubber, greater than about 0.6 pph of an organic peroxide, a sufficient amount of filler to produce the outer core specific gravity and more than about 35 pph of zinc diacrylate.
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9. The golf ball of claim 1, wherein the cover layer has a thickness of from about 0.03 inches to about 0.04 inches.
10. The golf ball of claim 1, wherein the cover layer comprises polyurea or polyurethane.
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11. The golf ball of claim 1, further comprising a moisture barrier layer disposed between the outer core layer and the cover layer, wherein the moisture barrier layer comprises a moisture vapor transmission rate that is less than a moisture vapor transmission rate of the cover layer.
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12. The golf ball of claim 11, wherein the moisture barrier layer has a specific gravity of from about 1 to about 2, and a thickness of less than about 0.03 inches.
13. The golf ball of claim 11, wherein the moisture barrier layer comprises a styrene block copolymer and aluminum flake.
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14. A golf ball comprising:  
an inner core having a compression of less than about 50;  
at least one outer core layer surrounding the inner core and having a hardness of at least  
25 80 Shore C and a specific gravity of at least 1.1; and  
a cover surrounding the outer core layer;  
wherein the inner core has a hardness less than a hardness of the outer core and a specific gravity less than or equal to the outer core specific gravity.
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15. The golf ball of claim 14, wherein the inner core hardness is about 78 Shore C and the outer core hardness is greater than about 90 Shore C.

16. The golf ball of claim 14, wherein the inner core compression and outer core compression are selected to provide a combined overall core compression of greater than about 50.
- 5 17. The golf ball of claim 14, wherein the inner core has a diameter of from about 1.4 inches to about 1.5 inches and the outer core has a thickness of from about 0.05 inches up to about 0.1 inches.
- 10 18. The golf ball of claim 14, wherein the inner core comprises about 100 pph of a polybutadiene rubber, greater than about 25 pph of a zinc diacrylate, greater than about 0.5 pph of an organic peroxide and a sufficient amount of filler to produce the inner core specific gravity.
- 15 19. The golf ball of claim 14, wherein the outer core comprises about 100 pph of a polybutadiene rubber, greater than about 0.6 pph of an organic peroxide, a sufficient amount of filler to produce the outer core specific gravity and more than about 35 pph of zinc diacrylate.
- 20 20. The golf ball of claim 14, further comprising a moisture barrier layer disposed between the outer core layer and the cover layer, wherein the moisture barrier layer comprises a moisture vapor transmission rate that is less than a moisture vapor transmission rate of the cover layer.
- 25 21. The golf ball of claim 20, wherein the moisture barrier layer has a specific gravity of from about 1 to about 2, and a thickness of less than about 0.03 inches.
22. The golf ball of claim 20, wherein the moisture barrier layer comprises a styrene block copolymer and aluminum flake.
- 30 23. A golf ball comprising:  
a multi-layer core comprising:

an inner core having a Shore C hardness less than about 80 and a compression of less than about 70; and

at least one outer core layer having a Shore C hardness of greater than about 80, an amount of zinc diacrylate of greater than about 35 pph; and

5 a cover layer having a Shore D hardness of less than about 65;

wherein at least one outer core layer has a moisture vapor transmission rate that is lower than that of the cover layer, and the multi-layer core has a diameter of greater than about 1.58 inches.

10 24. The golf ball of claim 23, wherein the outer core layer has a Shore C hardness of greater than about 90.

25. The golf ball of claim 24, wherein the zinc diacrylate level in the outer core layer is greater than about 40 pph.

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26. The golf ball of claim 24, wherein the multi-layer core diameter is greater than about 1.6 inches.

20 27. The golf ball of claim 24, wherein the inner core comprises about 100 pph of a polybutadiene rubber, greater than about 25 pph of a zinc diacrylate, greater than about 0.5 pph of an organic peroxide and a sufficient amount of filler to produce the inner core specific gravity, the outer core comprises about 100 pph of a polybutadiene rubber, greater than about 0.6 pph of an organic peroxide, a sufficient amount of filler to produce the outer core specific gravity, and the cover layer comprises polyurea or  
25 polyurethane.

28. The golf ball of claim 24, wherein the inner core compression is less than about 50 and the inner and outer cores have a combined dual core compression of from about 80 up to about 100, the inner core has a specific gravity of about 1.05 and the outer core layer  
30 has a specific gravity less than the specific gravity of the inner core, the inner core has a diameter of from about 1.4 inches to about 1.5 inches, the outer core has a thickness of

from about 0.05 inches up to about 0.1 inches, the cover layer has a thickness of from about 0.03 inches to about 0.04 inches, the inner core has a coefficient of restitution of from about 0.8 to about 0.825 and the inner and outer cores have a combined dual core coefficient of restitution of from about 0.805 up to about 0.83.

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29. The golf ball of claim 29, further comprising an additional core layer surrounding the outer core layer and having a thickness of from about 0.005 inches to about 0.01 inches and a specific gravity of greater than 5.